

REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendments and the following remarks.

The invention of claim 1 is a combination of a detector and a shunt resistor carried by a circuit board with parallel opposite faces wherein the shunt resistor comprises electrical traces on opposite sides of the circuit board and in overlying relationship. The detector has inputs connected across the shunt resistor and is itself mounted on the same circuit board as shown in Figure 2 of the patent drawing and as described in the patent specification. This statement is not intended to be a substitute for the claim itself, but is a way to refresh the Examiner's recollection.

Claim 1 is rejected under 35 U.S.C. § 103(a) as unpatentable over Bilotti et al. 5,457,364 in view of Lee et al. 6,194,990. The Examiner argues in essence that it would have been obvious to a person of ordinary skill in the art at the time the present invention was made to use Lee et al.'s resistor in place of Bilotti et al.'s shunt resistor 60 as shown in Figure 1 of the drawing.

Bilotti et al. discloses a full-wave bridge driver with four driver transistors to apply current in opposite directions to a motor 26 in a push-pull fashion. The patent says nothing about circuit boards or any other technique for physically packaging the various components which are used in the circuit of Figure 1. It is noted in this regard that the resistor 60, to the extent it is connected "across" the inputs of the comparator 62, is in circuit with a bias voltage source 64.

More importantly, the Bilotti et al. patent disclosure deals with a motor drive circuit wherein the bridge circuit path does not include the inductance of the motor. The patent goes on to say that the bridge fault current rises almost instantaneously. Because the pulse width modulator in the clamping or bridge-current limiting circuit is "essentially transparent to fast fault currents, so that for all motor operating conditions, including starting and rotor locked conditions, the pulse width modulator does not respond to low inductance path faults so that such fast-rising fault

currents penetrate the current threshold of the start current clamp circuit and trigger the over current fault detector” (col. 2, ll. 29-36).

In short, the Bilotti et al. disclosure indicates no need whatsoever for a low inductance shunt resistor to deal with the problem of parasitic inductance.

Lee et al. discloses a folded-back resistance layer for a multi-layer circuit board wherein the upper and lower resistor traces are “self-aligned” to very nearly cancel out the self-inductance of each resistor layer thus lowering parasitic inductance. The resistor itself is placed on a circuit board but there is nothing in the patent to suggest that the same circuit board can or should be constructed to accommodate additional elements. In addition, the teaching of Lee et al. is directly concerned with the manufacture of thin-film metal resistors “that can have *high resistance*. . .”; see col. 1, l. 16.

Applicant respectfully submits that it would not be obvious to one of ordinary skill in the art to combine Bilotti et al. with Lee et al. so as to produce the exact combination set forth in claim 1 and that the rejection of claim 1 based on 35 U.S.C. § 103(a) uses hindsight reconstruction. To start with, Bilotti et al. does not have, or does not recognize, the problem which is addressed by Applicant’s invention. The quote from the Bilotti et al. specification regarding the transparency of the circuit to fast-occurring motor faults strongly suggests that the problem does not exist in the Bilotti et al. circuit. Accordingly, there would be no motivation whatsoever for the person of ordinary skill in the art seeking ways to construct or implement the Bilotti et al. circuit to suppose that it would be necessary or desirable to use an overlying trace resistor for the shunt resistor 60, much less to place that resistor on the same circuit board as the detector/comparator 62. Circuit packaging is in itself a precise and demanding art and the two references the Examiner relies on to impermissibly construct Applicant’s invention using selected components fail to deal with the intricacies of the packaging issue which is addressed and solved by the combination of claim 1.

Claim 1 does not state that the shunt resistor has a low ohmic value, but that is certainly the thrust of Applicant's specification. Therefore, the express reference to *high* ohmic in Lee et al. would militate *against* the use of the Lee et al. technology in the Bilotti et al. combination. Reconsideration is requested.

Claims 2, 5 and 6 are also rejected on the combination of Bilotti et al. in view of Lee et al., the examination report pointing out various physical aspects set forth in the claims which allegedly are found in the prior art. The rejections beg the question which is posed in the argument above pertaining to claim 1 and do not deal with the overall circuit packaging issue which Applicant sees and solves. Reconsideration of these rejections is respectfully requested.

Claim 7 is rejected on Bilotti et al. in view of Lee et al. The Examiner recognizes that claim 7 calls for a shunt resistor in the "milliohm" range whereas the Lee et al. resistor is specifically described as a "kilo-ohm" resistor. Despite the difference, the Examiner takes judicial notice that the difference is immaterial, suggesting that persons involved in patentability decisions have no interest in whether or not the circuit which results from their reassembly of components from diverse references has any practical function. Indeed, there is nothing in the references to suggest that one can substitute a resistor of several thousand ohms for the shunt resistor 62 of Bilotti et al. and still have a comparator circuit which works. Reconsideration of the rejection of claim 7 is respectfully requested.

The Examiner will further note that claim 7 has been amended to describe an arrangement involving the use of a "via" to connect that lowermost trace of the multi-layer resistor to one input of the comparator. There is nothing in the prior art to suggest this combination. Claim 7 appears to distinguish from any obvious combination of the prior art in several substantive ways and reconsideration is respectfully requested.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Bilotti et al. in view of Lee et al. and further in view of Pollersbeck 5,914,545. The Pollersbeck patent allegedly shows the use of an amplifier 15 as a comparator and/or threshold detector. No argument on this score is advanced. However, the objection again begs the question as to whether the basic combination of Bilotti et al. with Lee et al. is obvious for the reasons set forth above in traversing the rejection of claim 1. Again, reconsideration is requested.

The rejection of claim 4 relies on the argument that Bilotti et al. in view of Lee et al. in view of Pollersbeck meet claim 3; this argument goes back to the Section 103 rejection of claim 1 which has been fully traversed. No further argument is needed with respect to claim 4.

Claim 8 is rejected under 35 U.S.C. § 103(a) as unpatentable over Pollersbeck in view of Lee et al. Contrary to the sweeping allegations behind the rejection, Pollersbeck does not disclose a shunt resistor connected in series between a power supply and a drive motor. The amplifier 15 does not have inputs connected across the shunt resistor 3 and the overall circuit arrangement does not correspond with the claimed circuit on a component-for-component comparison. While again the simple replacement of a shunt resistor in Pollersbeck with the Lee et al. plated resistor would not meet all of the limitations of the claim. Accordingly, claim 8 is resubmitted in unamended form.

All of the other rejections deal with dependent claims and appear to require validity in the underlying rejection of independent claims in order to have any substantive effect. Since the underlying rejection of the independent claims appears to be incorrect, no detailed argument with respect to the dependent claims appears to be necessary.

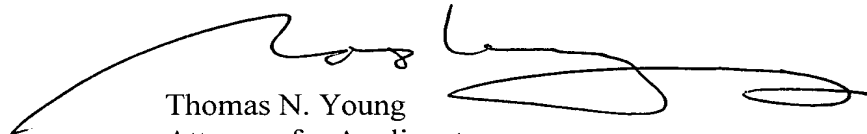
It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's objections and rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in

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the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance, notice of which is requested.

If the Examiner has any specific issues of form or substance which might be most effectively addressed in a telephone conference, he is invited to call Applicant's counsel at the telephone number indicated on this paper.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Thomas N. Young', is written over a horizontal line.

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